

Paweena Buchatian 2556: Biology and Efficiency of the Chromolaena Stem Gall Fly, *Cecidochares connexa* (Macquart) (Diptera: Tephritidae) as Biological Control Agent of Siam Weed *Chromolaena odorata* (L.) King and Robinson. Master of Science \ (Entomology), Major Field: Entomology, Department of Entomology. Thesis Advisor: Associate Professor Wiwat Suasa-ard, Ph.D. 88 pages.

This study provides a scientific foundation for the use of the chromolaena stem gall fly, *Cecidochares connexa* (Macquart) in biological control of the Siam weed *Chromolaena odorata* (L.) King and Robinson. It consists of three principal parts: 1) investigation the biology of the chromolaena stem gall fly and its life table; 2) test the host specificity of the fly, and 3) evaluation the efficiency of the fly for the control of the Siam weed. Results obtained in the first study showed that female fly mated once for her entire life and laid eggs in mass in the terminals and young buds of the Siam weed, ranging from 1-12 eggs; and maximum number of egg laid was on day 3. Egg and larval periods were 6.00 ± 0.94 and 10 ± 3.84 days, respectively. Prior to pupation, mature larvae tunneled towards the surface of the gall leaving a thin epidermal layer visible from the outside as a small, grey, circular 'window' through which it emerged as adult flies. The pupal period was 22.60 ± 1.84 days. Longevity of adult male and female was 8.00 ± 0.89 and 14.00 ± 1.00 days, respectively. Developmental period from egg to adult, for male and female averaged 57.88 ± 5.09 and 63.32 ± 5.31 days, respectively. Number of pupae/gall ranged from 1-5 and the most frequent observed was two which account for 40% (n=100). For those life table parameters, the net reproductive rate (R_0), the cohort generation time (T_c), the capacity of increase (r_c) and the rate of increase (λ) were 6.54 ♀/♀ 59.03 day, 0.032 ♀/♀day and 1.03 ♀/♀day , respectively. Subsequently, in the second study, host-specificity tests in choice and non-choice tests, on 21 selected plant species in seven families, oviposition occurred only on the Siam weed, while none did on those non-target plant species. This exhibited the strong host specificity of the fly. In the final study, plant height of the infested plants with galls was reduced to 17.87, 35.62 and 51.68 percent when compared with the normal plants after the initial infestation 30, 60 and 90 days, respectively. Infestation also resulted in negative effects with 44.59, 51.23, 42.40, 55.27, 56.29 and 57.49 percent reduction of the number of branches/plant, inflorescences/plant, flowers/inflorescence, seeds/ flower head and the width and length of leaf of the Siam weed, respectively. Laboratory studies were carried out at the National Biological Research Center, Central Region Center, Kamphang Sean, Nakhon Pathom, during July in 2009 - June in 2011.

Student's signature

Thesis Advisor's signature